

63. (New) The system of claim 54, wherein the system further comprises at least one passivation film forming agent.

64. (New) The system of claim 54, wherein the abrasive is a metal oxide abrasive.

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65. (New) The system of claim 64, wherein the abrasive is selected from the group consisting of alumina, ceria, germania, silica, titania, zirconia, and coformed products thereof, and mixtures thereof.

66. (New) The system of claim 65, wherein the abrasive is alumina.

67. (New) A composition for polishing one or more layers of a multi-layer substrate that includes a first metal layer and a second layer comprising (i) a liquid carrier, (ii) at least one oxidizing agent, (iii) at least one polishing additive that increases the rate at which the system polishes at least one layer of the substrate, (iv) at least one stopping compound with a polishing selectivity of the first metal layer:second layer of at least about 30:1, wherein the stopping compound is a cationically charged nitrogen containing compound selected from compounds comprising imines, amides, imides, and mixtures thereof, to be used with a polishing pad and/or an abrasive.

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#### REMARKS

##### *Information Disclosure Statement*

Applicants have received a copy of the Examiner-initialed Form PTO-1449 identifying references AA-AP, but note that reference AM has not been initialed by the Examiner. Applicants respectfully request confirmation of the consideration of reference AM by return copy of the Examiner-initialed Form PTO-1449 showing the Examiner's initials next to the identification of reference AM.

##### *The Present Invention*

The present invention relates to a polishing system and composition for use in polishing a substrate, particularly a multi-layer substrate that includes a first metal layer and a second layer. Claims 1-6, 11-31, 36-44, and 47-67 currently are pending.

*Summary of Examiner Interview*

Applicants thank Examiner Utech for the courtesies extended to applicants' representatives, John Kilyk, Jr. and Robert M. Lanning, during the telephonic interview of February 5, 2003. The Section 103 rejection was discussed, consistent with the remarks set forth herein.

*Discussion of the Claim Amendments*

Claims 1 and 36 have been amended to incorporate the subject matter of claims 9 and 10, which claims have been cancelled. In particular, claims 1 and 36 have been amended to recite a stopping compound selected from the group consisting of the amine-containing compounds recited in claims 9 and 10. These amendments are supported by the claims as originally filed and the specification, for example, at page 4, lines 6-9, and page 8, line 36 – page 9, line 9. Claim 36 also has been amended to correct a typographical error. Claim 6 has been amended to more particularly point out and distinctly claim the invention. Claims 7-10 have been cancelled as superfluous in view of the amendment made to claim 1. New claims 52-67 have been added to incorporate portions of the subject matter excluded by the amendments to claims 1 and 36. In particular, claims 52 and 67 recite a system and composition, respectively, in which the stopping compound is a cationically charged nitrogen containing compound selected from compounds comprising imines, amides, imides, and mixtures thereof. Claims 53-66 recite the subject matter of original claims 2-7, 11-13, and 27-31 insofar as they related to stopping compounds selected from compounds comprising imines, amides, imides, and mixtures thereof. Each of the aforementioned amendments is supported by the specification and claims as originally filed. No new matter has been added by way of these amendments.

*Summary of the Office Action*

The Office Action rejects claims 1-31, 36-44, and 47-51 under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent 5,770,103 (Wang et al.) (hereinafter "the Wang '103 patent").

*Discussion of the Section 103 Rejection*

The Office Action rejects claims 1-31, 36-44, and 47-51 as allegedly obvious over the Wang '103 patent. In particular, the Office Action asserts that the Wang '103 patent discloses an aqueous, chemical-mechanical polishing slurry comprising water, abrasive particles, an oxidizing agent, and a mono-, di-, or tri-substituted phenol wherein at least one of the substituted functional groups is polar. The Office Action further asserts that the Wang

'103 patent provides that the polar functional group can be an amine and that the slurry, when used to polish a substrate having a tungsten and titanium/titanium nitride layer, polishes the titanium/titanium nitride layer at a faster rate than the tungsten layer. Lastly, the Office Action asserts that, at the time of invention, it would have been obvious for one of ordinary skill in the art to increase the polishing selectivity of the slurry disclosed in the Wang '103 patent to achieve the selectivity recited in the pending claims.

Contrary to the Office Action's assertions, the invention defined by the pending claims is not *prima facie* obvious over the Wang '103 patent. In particular, the Wang '103 patent fails to teach or suggest all of the elements recited in the pending claims. See MPEP § 2142 (setting forth the requirements for a *prima facie* obviousness case). As noted above, the Wang '103 patent discloses a polishing slurry containing a substituted phenol having at least one polar functional group, such as an amine. By way of contrast, claims 1 and 36 recite a system or composition wherein the stopping compound is selected from the group consisting of a polyetheramine, polyethylenimine, N<sub>4</sub>-amino(N,N'-bis-[3-aminopropyl]ethylenediamine), 4,7,10-trioxatridecane-1,13-diamine, 3,3-dimethyl-4,4-diaminodicyclohexylmethane, 2-phenylethylamine, N,N-dimethyldipropylenetriamine, 3-[2-methoxyethoxy]propylamine, dimethylaminopropylamine, 1,4-bis(3-aminopropyl)piperazine, isophoronediamine, hexamethylenediamine, cyclohexyl-1,3-propanediamine, thiomine, (aminopropyl)-1,3-propanediamine, tetraethylenepentamine, tetramethylbutanediamine, propylamine, diaminopropanol, aminobutanol, (2-aminoethoxy)ethanol, and mixtures thereof. None of the aforementioned compounds is a mono-, di-, or tri-substituted phenol compound, such as those taught by the Wang '103 patent. Furthermore, nothing within the Wang '103 patent suggests that the disclosed polishing slurry could be modified in such a way as to arrive at the invention defined by claims 1 and 36. Indeed, the entire disclosure of the Wang '103 patent teaches that the substituted phenol compound is essential to the success of the disclosed polishing slurries. See, e.g., MPEP § 2143.01 (to support a *prima facie* obviousness rejection, a proposed modification cannot change a reference's principle of operation). Therefore, without more, the Wang '103 patent fails to teach or suggest all of the elements of the invention defined by claims 1 and 36, and, accordingly, the invention defined by claims 1 and 36 cannot properly be considered *prima facie* obvious over the Wang '103 patent.

With respect to new claims 52 and 67, the Wang '103 patent similarly fails to teach or suggest all of the elements recited in the pending claims. As noted above, claims 52 and 67 recite a system or composition comprising at least one stopping compound with a polishing selectivity of the first metal layer:second layer of at least about 30:1, wherein the stopping compound is a cationically charged nitrogen containing compound selected from compounds


comprising imines, amides, imides, and mixtures thereof. By way of contrast, the Wang '103 patent only discloses a polishing slurry containing a substituted phenol compound having at least one polar functional group, such as a hydroxyl group, a nitro group, an amine group, a carboxyl group, a sulfo group, or a phospho group. Indeed, the Wang '103 patent fails to even mention imines, amides, or imides, much less teach or suggest a polishing composition containing the same. Furthermore, the Office Action fails to point to any knowledge available to those of ordinary skill in the art at the time of invention which would have motivated the artisan to modify the polishing slurries disclosed in the Wang '103 patent in such a way as to arrive at the invention defined by pending claims 52 or 67. Therefore, claims 52 and 67 cannot properly be considered *prima facie* obvious over the Wang '103 patent.

In view of the foregoing, the Wang '103 patent fails to teach or suggest all of the elements recited in the pending claims. Moreover, the Office Action fails to point to any teaching or suggestion available to those of ordinary skill in the art at the time of invention which would have motivated one of ordinary skill to modify the Wang '103 patent in such a way as to arrive at the invention defined by any of the pending claims. Accordingly, the pending claims cannot properly be considered *prima facie* obvious over the Wang '103 patent. The rejection under Section 103, therefore, should be withdrawn.

#### *Conclusion*

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

  
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Date: February 19, 2003

In re Appln. of Wang et al.  
Application No. 09/636,246

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I hereby certify that this INFORMATION DISCLOSURE STATEMENT and all accompanying documents are being deposited with the United States Postal Service "Express Mail Post Office To Addressee" Service under 37 CFR 1.10 on the date indicated below and is addressed to: Commissioner for Patents, Washington, D.C. 20231.

Juaquina Murio		February 19, 2003
Name of Person Signing	Signature	Date